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Water & Sediment Quality

Standard Operating Procedure

WQ&S C3100 – Inline Sediment Traps



Seattle Public Utilities
Seattle, Washington

This document is part of the Science Information Quality System and describes standard operating procedures to ensure a systematic consistent approach is followed for collecting, assessing, and documenting environmental data of known and documented quality.

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WQ&S C3100 – Inline Inline Sediment Traps

See also the following Standard Operating Procedures:

WQ&S Q1000 General (Specific program needs - training, roles & responsibilities, etc.)

WQ&S Q1100 Data Validation (review & verification, validation, assessment)

WQ&S Q1200 Data Management (retrieval through archiving)

WQ&S Q1300 Data Requests

A. Introduction, Scope, and Applicability

Sediment traps are designed to passively collect samples of suspended solids present in stormwater runoff. This Standard Operating Procedure (SOP) describes field procedures that will be utilized to ensure that sediment traps are installed in a consistent manner to collect samples that are representative of the matrix being sampled, and the data will be comparable to data collected by other existing and future monitoring programs. Procedures are described for installing sediment traps, retrieving sample bottles, decontaminating sample bottles, and recording field measurements and conditions.

Sampling procedures will generally follow *Recommended Protocols for Measuring Selected Environmental Variables in Puget Sound* (PSEP 1997) and the *NPDES Stormwater Sampling Guidance Manual* (U.S. EPA 1992).

B. Training

SPU staff must comply with City confined space entry procedures before entering drainage and/or combined sewer systems for sediment trap installation (see SPU 2007).

All personnel implementing this SOP are required to be currently certified for:

- 40 hour hazardous waste operations training per WAC 296-843.
- Confined space entry training per WAC 296-809.

C. General Considerations

Wherever possible, traps will be mounted in quiescent areas (e.g., maintenance holes and vaults) to maximize sample collection. Sampling locations will be selected to avoid small diameter pipes (e.g., less than 24-inch diameter) because a large storm event is generally needed in these systems to inundate the approximately 8-inch tall sample bottle.

D. Equipment and Supplies

Sediment traps consist of a stainless steel bracket mounted inside the storm drain system. The bracket holds a wide-mouth Teflon bottle (Figure 1). Sediment traps were initially designed by the State Department of Ecology (Wilson and Norton 1996, Barnard and Wilson 1995) and have since been modified by both Tacoma (Norton 1997) and SPU. SPU's modifications permit the use of a wide mouth bottle and expand on Tacoma's changes to enable the sample bottle to be installed in a vertical position in most field conditions (i.e., maintenance holes, vaults, and pipes). Brackets are mounted onto the wall of the pipe, maintenance hole, or other structure using metal hit anchors (Hilti®). Extension plates can be used when the sediment trap bracket is mounted to a vertical wall and the bracket is submerged below the water level.

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Equipment and supplies needed to implement this SOP include:

Confined space entry and safety equipment:

- Confined space entry/safety equipment (tripod/winch, safety harness, 4-gas meter, emergency contacts)
- Maintenance hole hook
- Hard hat
- Safety vest
- Steel toe boots

Sampling equipment:

- Sediment trap brackets
- Teflon containers for sediment traps - SPU supplied/laboratory cleaned
- Rotohammer drill with 1/4" concrete drill bit
- Stainless steel metal hit anchors (Hilti®)
- Hammer

Sampling supplies:

- Latex gloves
- Cooler with ice

Documentation supplies:

- Field notebook
- Sample labels
- Chain-of-custody forms
- Camera.

E. Procedures

The field lead is responsible for ensuring that the sampling team meets the training requirements, that traffic control is in place if needed, and all confined space procedures are followed as appropriate.

1. SEDIMENT TRAP INSTALLATION

Two traps will be installed at each monitoring location to ensure that an adequate volume of sample is collected for chemical analysis. In vaults and maintenance holes that are equipped with sumps, the trap will be mounted so that the mouth of the sample bottle is just above the base flow level or static water level to sample only storm flows. In pipes and other locations, the trap will be installed at the lowest point in the pipe.

The angle of the bracket is adjustable in order to install the sediment trap in a vertical position. The bracket is designed to be mounted with the angle adjustment plane perpendicular to the flow (see Figure 1). Before installing the bracket, test fit the bracket at the intended location and adjust the angle of the bracket into the most vertical position.

A rotohammer drill equipped with a 1/4" concrete drill bit is used to drill the pilot holes for mounting the bracket. The pilot holes are drilled through the four mounting holes located on each corner of the bracket. Stainless steel hit anchors are inserted through the bracket and into the pilot holes. The pin of the metal hit anchor is driven down with a hammer to secure the bracket into place. Figure 2 shows a typical sediment trap installation at the lowest point in the pipe. In vaults or maintenance holes with base flow or standing water, an extension plate can be used to mount the bracket so that the bottle opening is flush or slightly higher than the standing water level. If an extension plate is used, the bracket must be mounted to the extension plate using short 1/4" diameter bolts before mounting into place. Figure 3 shows sediment traps mounted to the vertical wall of a vault using extension plates.

At the end of the project, the sediment traps will be retrieved and decontaminated. The cleaning protocol for sediment traps is summarized below:

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- Phosphate-free detergent wash and tap water rinse
- Reagent-grade water rinse
- Ultra-pure methanol rinse
- Air dry.

2. SEDIMENT TRAP INSPECTION

Traps will be checked every 6 months, or as specified by the Quality Assurance Project Plan, to evaluate their condition (e.g., damage and sediment volume). If necessary, installations may be modified to improve sample collection and/or repair any damage that may occur. Possible changes include:

- Install more traps (if less than 0.5 inches of sediment deposited during a 6-month period)
- Install debris deflectors to protect the trap and prevent debris (e.g., plastic bags) from blocking the trap
- Install a weir or other structure to enhance sediment deposition by ensuring that the sample bottle is inundated under most storm flows
- Move traps to a different location.

3. SAMPLE COLLECTION

This section describes procedures for retrieving the sample from the sediment trap, preparing quality control samples, and cleaning the sample trap bottles.

3.1. Sample Bottle Retrieval

Traps will be checked every 6 months, or as specified by the Quality Assurance Project Plan, to evaluate their condition (e.g., damage and sediment volume) and to retrieve the bottles for chemical analysis. Traps will be retrieved before and after the winter wet season, approximately September and March of each year.

Sample bottles will be retrieved following PSEP (1997) sample handling guidelines. Latex gloves will be worn at all times when collecting sediment samples. The sample bottles will be capped in place with a clean Teflon lid, removed from the bracket, stored in a cooler on ice, and transported directly to the analytical laboratory. Clean Teflon bottles will be immediately redeployed for the next 6-month sampling period. Descriptions of field observations (e.g., potential construction activities that could interfere with sample collection) and sample characteristics (e.g., sheen, odor, color, amount and type of particles being removed, size description) will be included in the field notes recorded during sample collection.

3.2. Sample Bottle Cleaning

Teflon sample bottles will be cleaned by the analytical laboratory and returned to SPU for storage and re-use. After cleaning, the bottles will be capped for storage and transport. The cleaning protocol is summarized below:

- Phosphate-free detergent wash and tap water rinse
- 10 percent ultra-pure hydrochloric acid rinse
- Reagent-grade water rinse
- Ultra-pure methanol rinse
- Air dry.

F. Records and Documentation

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Copies of the field notes, the signed chain-of-custody, and the sample results (pdf and electronic data deliverable file received from the analytical laboratory) will be maintained in the project file.

G. References

- Barnard, B. and C. Wilson. 1995. Stormwater sediment trap literature review and design consideration. No. 95-309. Washington Department of Ecology, Olympia, WA.
- Norton, D. 1997. Stormwater sediment trap monitoring of discharges to The Foss Waterway. No. 97-322. Washington Department of Ecology, Olympia, WA.
- SPU. 2007. Seattle safety policy and procedures in confined space entry. SPU-SAF-001. Seattle Public Utilities, Safety Office, Seattle, WA.
- PSEP. 1997. Recommended Protocols for Measuring Selected Environmental Variables in Puget Sound. Prepared by Washington Department of Ecology, Olympia, Washington for EPA, Region 10, Office of Puget Sound, Seattle, WA. April 1997.
- Wilson, C. and D. Norton. 1996. Stormwater sediment trap pilot study. No. 96-347. Washington Department of Ecology, Olympia, WA.

H. List of Revisions

The current list of revisions for this SOP follows.

| Revision Number | Effective Date | Review Status | Revised by | Revision Summary |
|-----------------|----------------|---------------|--------------------|---|
| R0D1 | 3/3/2008 | Draft | Brian Robinson | Draft |
| R0D1 | 4/8/2008 | Draft | Beth Schmoyer | Review comments. |
| R0D2 | 4/9/2008 | Draft | Shelly Basketfield | Modified headings. Revised number from WQ&S 3301. |

I. Tables, Forms, and Figures

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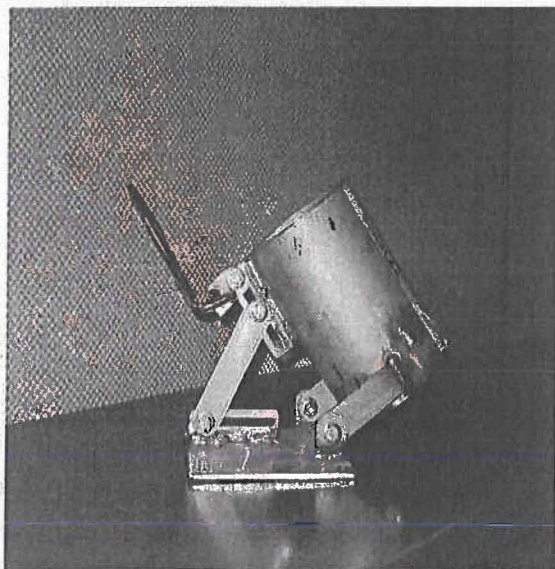


Figure 1: SPU sediment trap mounting bracket.



Figure 2: Typical sediment trap installation.



Figure 3: Sediment traps mounted vertically on the sidewall of a vault.

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